

# Vascular Flora of a Cerrado *sensu stricto* remnant in Pratânia, state of São Paulo, southeastern Brazil

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**ABSTRACT:** The Cerrado (Brazilian savanna) has suffered massive destruction in recent years, mainly due to the expansion of agricultural areas. Many remnants of this vegetation are still poorly studied. Therefore, the purpose of this study was to carry out a floristic survey in a remnant of Cerrado in the municipality of Pratânia, central-west region of state of São Paulo, southeastern Brazil. In total, 120 species (38 families, 88 genera) were registered. The families with greater richness were: Fabaceae (23 species), Asteraceae (15), Myrtaceae (10), Malpighiaceae and Rubiaceae (seven each) and Bignoniaceae (five). The shrub component was predominant in the study area representing 37.5 % of the recorded species. A comparison among eight Cerrado areas showed greater similarity between areas with similar altitude.

## INTRODUCTION

The Brazilian savanna, so-called Cerrado, is the second largest biome of Brazil (Ribeiro and Walter 1998) and occupies the intermediate region between the two largest Neotropical moist forests: the Amazon forest and Atlantic forest (Méo *et al.* 2003).

The typical vegetation landscape of this biome consists of savanna of very variable structure, encompassing different vegetation physiognomies, and is termed Cerrado *sensu lato*. Depending on some environmental characteristics a series of physiognomies can be found, ranging from open grasslands (campo limpo) to dense woodlands (cerradão), with three intermediate physiognomies: campo sujo, grassland with a scattering of shrubs and small trees; *campo* Cerrado, where there are more shrubs and trees but still a larger proportion of grassland; and Cerrado *sensu stricto*, where trees and shrubs dominate but with a fair amount of herbaceous vegetation (Coutinho 2002). These differences are due to the wide area and distribution of Cerrado vegetation which provides a variety of environmental conditions related to seasonal precipitation, soil fertility and drainage, temperature and fire regime (Durigan *et al.* 2003). These variations condition the settlement of a Cerrado vegetation mosaic even in small areas (Coutinho 2002). According to Rizzini (1971), more than half of Brazil's central savanna flora is originated from other vegetation types, which also contributes to its floristic heterogeneity. Besides the ecological importance of the Cerrado, many elements of the Cerrado flora have some economic potential, for example, as a source of active ingredients for the pharmaceutical industry among other uses (Cavassan 2002).

Despite its relevance, the Cerrado has been continuously destroyed to create pastures and field crops. In São Paulo state, southeastern Brazil, the Cerrado remnants are today very reduced and fragmented (Durigan *et al.* 2004) and only 0.5 % of the original area is protected in some

kind of conservation unit (Durigan *et al.* 2006). Even so, these remnants are notably rich in species and therefore highly representative (Ratter *et al.* 2003) since 34 % of the total Cerrado species set can be found in São Paulo state (Cavassan 2002).

The Cerrado is included in the list of global *hotspots* or areas with high concentrations of endemic species, which suffered heavy habitat losses (Myers *et al.* 2000). The flora inventory is the first step to vegetation knowledge and its best use, serving as a basis for ecological studies and the planning of conservation projects (Felfili *et al.* 1993; Mendonça *et al.* 1998). Considering this, in the central-west region of São Paulo state, municipality of Pratânia, a Cerrado *sensu stricto* remnant was inventoried to provide a vascular flora check list. This study is part of a larger project which intends to perform a more detailed vegetation study concerning the structure and dynamics of the woody component of a Cerrado fragment in Pratânia Municipality, and was developed aiming to add information to the initial inventory performed by Machado *et al.* (2005), which included all three Cerrado physiognomies occurring in the area.

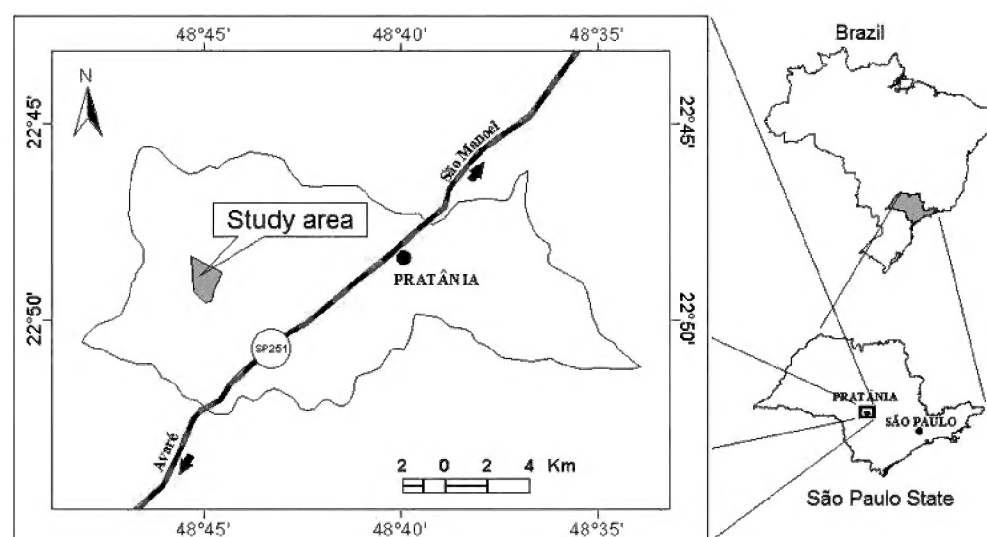
## MATERIALS AND METHODS

The studied area is a Cerrado *sensu stricto* remnant located within a larger Cerrado fragment of nearly 180 ha that also presents other two Cerrado physiognomies: a cerradão and a campo Cerrado remnant. The fragment belongs to a private reserve of Cerrado (22°48'50" S, 48°44'36" W: 720 m average altitude), located in Pratânia Municipality, at the central-west region of São Paulo state, southeastern Brazil (Figure 1). The fragment is surrounded by pastures, sugar cane and eucalyptus plantations. The climate of the region is Cwa according to Koeppen classification, that is, humid subtropical climate with hot summers and no prolonged drought, annual average temperature of 21°C and annual average rainfall of 1,128

mm (Déstro and Campos 2006). The soils are classified as Latosol and Argisol (according to the Brazilian System of Soil Classification, EMBRAPA 1999).

The floristic survey was carried from January to October 2008, on a weekly basis. Approximately 1 ha of the Cerrado *sensu stricto* area was inventoried and all species in reproductive phase were collected and identified. Voucher specimens were deposited in the Herbarium BOTU (Herbário “Irina Delanova Gemtchújnicov”, Instituto de Biociências de Botucatu, UNESP). The floristic similarity was estimated using the Jaccard Index (Mueller-Dombois and Ellenberg 1974) and included the present study and other seven previously published studies on Cerrado *sensu lato* vegetation performed in São Paulo state. Species with incomplete identification (only genus, aff. or cf.) were excluded as well as those whose occurrence was reported in just one area, according to methodology adopted by Ratter *et al.* (2003). Only floristic surveys which included all plant habits were compared. A cluster analysis among these eight areas was also performed using the Jaccard Index of Similarity and the UPGMA algorithm for the dendrogram elaboration (Sneath and Sokal 1973).

In the center of the sampled area a 5 x 30 m transect was delimited and every woody plant with stem basal diameter equal or superior to 3 cm was recorded and drawn, in order to make a profile diagram, according to Albuquerque and Rodrigues (2000).



**FIGURE 1.** Location of study area in Pratânia, state of São Paulo, south-eastern Brazil.

## RESULTS AND DISCUSSION

A total of 119 species of Angiosperms (37 families, 87 genera) and one pteridophyte were registered (Table 1). Although this number may seem small compared to core Cerrado (see Gottsberger and Silberbauer-Gottsberger 2006), many São Paulo state Cerrado areas have similar species number (see references in Table 2). Gottsberger and Silberbauer-Gottsberger (2006) also quoted these regional variations and provided an extensive discussion about this matter, pointing out that local edaphic condition and climate characteristics may interfere on the floristic composition, contributing to the extreme Cerrado flora heterogeneity.

The most species-rich families were Fabaceae with 23 species in total (10 species on Faboideae, seven on Mimosoideae and 6 on Caesalpinoideae), Asteraceae (15 species), Myrtaceae (10), Malpighiaceae and Rubiaceae (seven species each) and Bignoniaceae (five). These families account for 56 % of the surveyed species. The richest genera were *Eugenia* (five species), *Byrsonima*,

*Miconia*, *Mimosa* and *Vernonia* (four species each). Among the angiosperms, 20 families and 69 genera had one single species.

Several weeds (17 species) were found in the area: *Baccharis dracunculifolia*, *Bidens gardineri*, *Chamaecrista desvauxii*, *C. flexuosa*, *Commelina diffusa*, *Cuphea cartaginensis*, *Emilia sonchifolia*, *Lantana camara*, *Mikania cordifolia*, *Pterocaulon lanatum*, *Pyrostegia venusta*, *Sida linearifolia*, *Solanum americanum*, *S. lycocarpum*, *Spermacoce capitata*, *Vernonia cognata* and *V. polyanthes*. This indicates some disturbance, probably caused by the proximity of agricultural areas. Four Cerrado species found in the study area - *Arrabidaea brachypoda*, *A. florida*, *Byrsonima intermedia* and *Dimorphandra mollis* - are frequently quoted as weeds (Lorenzi 2008) in areas where the original Cerrado vegetation was removed for the introduction of crops or pastures.

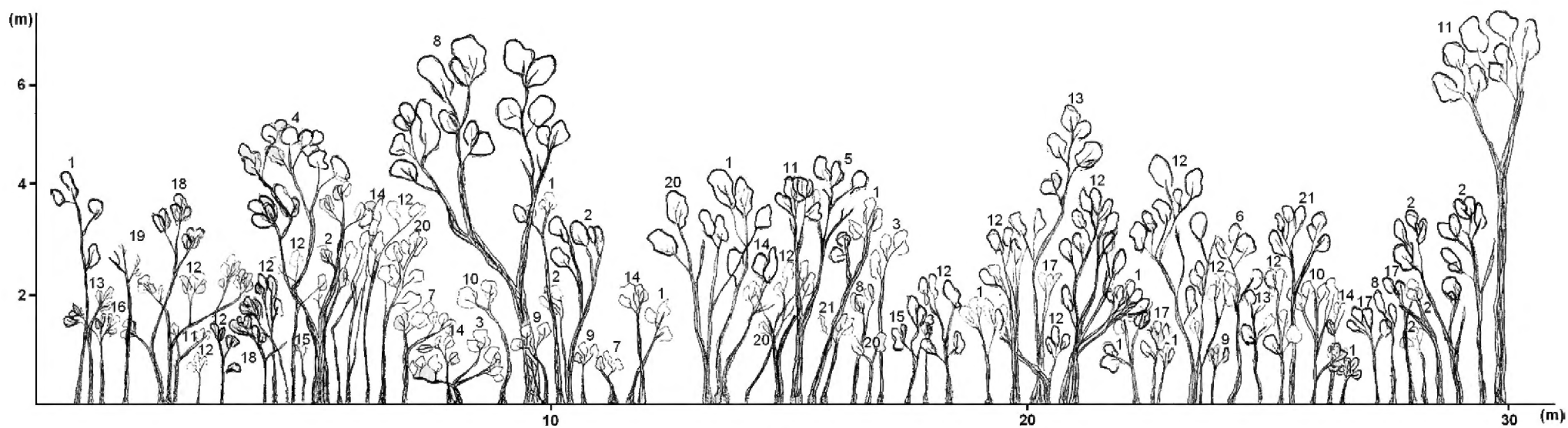
Shrubs make up 37.5 % of the inventoried flora, followed by herbs (27.5 %), trees (23 %), and vines (12 %). Among the shrub species, the richest families were Asteraceae and Myrtaceae (seven species each) and Fabaceae (five). Apocynaceae, Dilleniaceae, Erytroxylaceae, Euphorbiaceae, Lamiaceae and Proteaceae showed only one shrub species each. Among the herbs the richest families were: Fabaceae (nine species), Asteraceae (seven) and Rubiaceae (three). Acanthaceae, Amaranthaceae, Commelinaceae, Convolvulaceae, Euphorbiaceae, Lythraceae, Polypodiaceae and Sapotaceae had only one herbaceous species each. The arboreal component had Fabaceae (seven species), Malpighiaceae and Myrtaceae (three species each) as the richest families. Araliaceae, Chrysobalanaceae, Ebenaceae, Malvaceae, Ochnaceae, Salicaceae and Vochysiaceae had only one tree species each. The families with the highest number of vines were Apocynaceae and Bignoniaceae, both with three species each, and Fabaceae with two species. The other families where vines were represented had only one species each (see Table 1).

Machado *et al.* (2005), in an inventory of all Cerrado physiognomies in the same fragment quoted 168 species in total, but there was no indication of the class or classes of physiognomy where the plant species were found. This makes the comparisons difficult. However, it was possible to observe that 66 species were common to our inventory and that 54 species that we found were not collected by Machado *et al.* (2005), while they quote 102 other species that were not observed by us. These conflicting results are possibly due to the fact that our research was limited to the Cerrado *sensu stricto* area, while Machado *et al.* (2005) inventoried all the Cerrado physiognomies. On the other hand, the results highlight the fact that even in a restrict area more species can be found depending on the inventory effort.

The profile diagram of the vegetation (Figure 2) shows the occurrence of a dense woody layer, consisting of trees of small to medium size (three to six m tall), shrubs and sub-shrubs with multiple stems. A low, almost continuous canopy was observed, characterizing a dense Cerrado.

The overall number of species sampled in the eight localities chosen to be compared in relation to floristic similarity (Table 2) was 752. From this total, 431 species were discarded because they occurred in just one location.





**FIGURE 2.** Profile diagram representing the woody component in the area of Cerrado *sensu stricto*, Pratânia, SP. 1. *Acosmium subelegans*, 2. *Bauhinia rufa*, 3. *Byrsonima coccolobifolia*, 4. *Byrsonima verbascifolia*, 5. *Casearia sylvestris*, 6. *Dimorphandra mollis*, 7. *Diospyros hispida*, 8. *Eriotheca gracilipes*, 9. *Erythroxylum tortuosum*, 10. *Gochnatia barrosii*, 11. *Machaerium acutifolium*, 12. *Miconia albicans*, 13. *Myrcia bella*, 14. *Myrcia lingua*, 15. *Ouratea spectabilis*, 16. *Piptocarpha rotundifolia*, 17. *Myrsine umbellata*, 18. *Schefflera vinosa*, 19. Dead plant, 20. *Stryphnodendron polyphyllum*, 21. *Styrax camporum*.

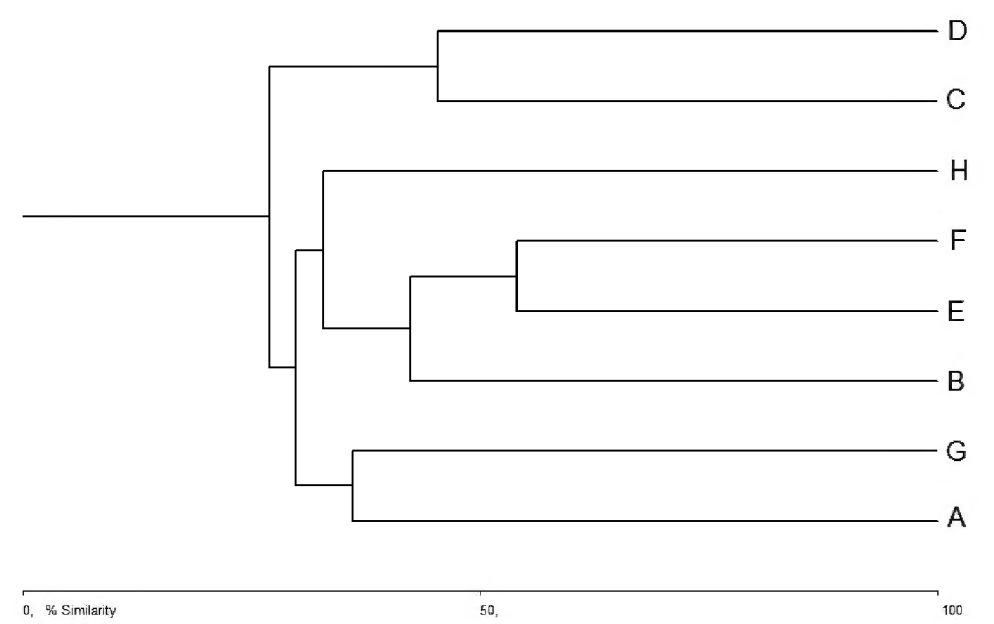
The remaining set revealed that only 10 species were recorded in all eight Cerrado areas: *Anadenanthera falcata*, *Byrsonima coccolobifolia*, *B. verbascifolia*, *Machaerium acutifolium*, *Miconia albicans*, *Myrcia bella*, *Ouratea spectabilis*, *Schefflera vinosa*, *Styrax ferrugineus* and *Vochysia tucanorum*. Only 125 species occurred in more than four Cerrado areas. There were also nine species that occurred only in the Cerrado of Pratânia: *Aspilia reflexa*, *Chromolaena congesta*, *Commelina diffusa*, *Crotalaria longifolia*, *Dalechampia micromeria*, *Ichthyothere elliptica*, *Mimosa xanthocentra*, *Pterocaulon lanatum* and *Serjania caracasana*.

The highest similarity index (54 %) was found between the Cerrado areas located in Botucatu Municipality, at altitudes around 500 m (Table 3). The similarity among the other sites was lower, but there was a trend leading to higher similarity between neighboring areas or between areas with similar altitude. In this category lies the Cerrado of Pratânia (720 m altitude) which was more similar to another Botucatu Cerrado (830 m altitude).

The cluster analysis (Figure 3) show the segregation of three major groups, one including areas of Assis, one including only the area of Pratânia and one area of Botucatu, both with higher altitudes (720 and 830 m, respectively) and other group joined areas with elevations ranging from 500 to 600 m. The higher similarity was observed between Cerrado areas within the same municipality or neighbor

areas (Table 3). These results support the statement that the Cerrado vegetation is extremely variable even in very close locations, as noted before in other Cerrado biome areas (Bridgewater et al. 2004).

The species-richness and the peculiarities of the Cerrado of Pratânia indicate the importance of this fragment as a remnant of the original Cerrado vegetation in the area and may possibly serve as a floristic reference for future conservation measures.



**FIGURE 3.** Cluster analysis (UPGMA) using Jaccard's Index among eight Cerrado *sensu lato* areas in São Paulo state. The areas are identified by letters (A to H) which are described in Table 2.

**TABLE 1.** Species recorded in the Cerrado *sensu stricto* area in Pratânia, SP.

SPECIES	POPULAR NAME	HABIT
Pteridophyta		
Polypodiaceae		
<i>Polypodium latipes</i> Langsd. & L. Fisch.	polipódio-de-pé-largo	Herb
Angiospermae		
Acanthaceae		
<i>Ruellia geminiflora</i> Kunth	ipecaconha	Herb
Amaranthaceae		
<i>Gomphrena macrocephala</i> A. St.-Hil.	para-tudo-do-Cerrado	Herb
Apocynaceae		
<i>Blepharodon bicuspidatum</i> E. Fourn.	-	Vine
<i>Blepharodon nitidum</i> (Vell.) J.F. Macbr.	-	Vine
<i>Mandevilla velutina</i> K. Schum.	jalapa	Shrub
<i>Temnadenia violacea</i> (Vell.) Miers	-	Vine

TABLE 1. CONTINUED.

SPECIES	POPULAR NAME	HABIT
Araliaceae		
<i>Schefflera vinosa</i> (Cham. & Schltdl.) Frodin & Fiaschi	mandioqueira	Tree
Asteraceae		
<i>Aspilia reflexa</i> Baker	bem-me-quer	Herb
<i>Baccharis dracunculifolia</i> DC.	alecrim-do-campo	Shrub
<i>Bidens gardneri</i> Baker	picão	Herb
<i>Chromolaena campestris</i> (DC.) R.M. King & H. Rob.	–	Shrub
<i>Chromolaena congesta</i> (Hook. & Arn.) R.M. King & H. Rob.	–	herb
<i>Emilia sonchifolia</i> (L.) DC.	bela-emília	Herb
<i>Gochnatia barrosii</i> Cabrera	cambará-veludo	Shrub
<i>Ichthyothere elliptica</i> H. Rob.	lixa	Herb
<i>Mikania cordifolia</i> (L. f.) Willd.	cipó-cabeludo	Vine
<i>Piptocarpha rotundifolia</i> (Less.) Baker	solidão	Shrub
<i>Pterocaulon lanatum</i> Kuntze	branqueja	Shrub
<i>Vernonia cognata</i> Less.	assa-peixe-roxo	Herb
<i>Vernonia geminata</i> Kunth.	–	Shrub
<i>Vernonia grandiflora</i> Less.	saudades-do-campo	Herb
<i>Vernonia polyanthes</i> Less.	assa-peixe	Shrub
Bignoniaceae		
<i>Arrabidaea brachypoda</i> (DC. Bureau)	cipó-una	Vine
<i>Arrabidaea florida</i> DC.	cipó-neve	Vine
<i>Jacaranda oxyphylla</i> Cham.	caroba-de-são-paulo	Shrub
<i>Pyrostegia venusta</i> (Ker Gawl.) Miers	cipó-de-são-joão	Vine
<i>Zeyheria montana</i> Mart.	bolsa-de-pastor	Shrub
Bromeliaceae		
<i>Ananas ananassoides</i> (Baker) L.B. Sm.	abacaxi-do-Cerrado	Herb
<i>Dyckia leptostachya</i> Baker	gravatazinho	Herb
Chrysobalanaceae		
<i>Couepia grandiflora</i> (Mart. & Zucc.) Benth. ex Hook.f.	oiti-do-sertão	Tree
Clusiaceae		
<i>Kielmeyera coriacea</i> Mart. & Zucc.	para-tudo	Tree
<i>Kielmeyera rubriflora</i> Cambess.	para-tudo	Tree
Commelinaceae		
<i>Commelina diffusa</i> Burm. f.	trapoeraba	Herb
Convolvulaceae		
<i>Evolvulus canescens</i> Meisn.	–	Herb
Cucurbitaceae		
<i>Cayaponia espelina</i> (Silva Manso) Cogn.	espelina-verdadeira	Vine
Dilleniaceae		
<i>Davilla elliptica</i> A. St.-Hil.	cipó-vermelho	Shrub
Ebenaceae		
<i>Diospyros hispida</i> A. DC.	caqui-do-Cerrado	Tree
Erythroxylaceae		
<i>Erythroxylum tortuosum</i> Mart.	galinha-choca	Shrub
Euphorbiaceae		
<i>Dalechampia micromeria</i> Baill.	goela-de-pato	Vine
<i>Manihot caerulescens</i> Pohl	mandioca-brava	Shrub
<i>Sebastiania serrulata</i> (Mart.) Mullenders	–	Herb
Fabaceae-Caesalpinioideae		
<i>Bauhinia rufa</i> (Bong.) Steud.	pata-de-vaca	Shrub
<i>Chamaecrista cathartica</i> (Mart.) H.S.Irwin & Barneby	sene-do-campo	Herb
<i>Chamaecrista desvauxii</i> (Collad.) Killip	sene	Shrub
<i>Chamaecrista flexuosa</i> (L.) Greene	mimosa	Herb
<i>Dimorphandra mollis</i> Benth.	falso-barbatimão	Tree
<i>Senna rugosa</i> (G. Don.) H.S. Irwin & Barneby	boi-gordo	Shrub

TABLE 1. CONTINUED.

SPECIES	POPULAR NAME	HABIT
Fabaceae-Faboideae		
<i>Acosmium subelegans</i> (Mohlenbr.) Yakovlev	amendoim-falso	Tree
<i>Bowdichia virgilioides</i> Kunth	sucupira-preta	Tree
<i>Clitoria simplicifolia</i> (Kunth) Benth.	–	Herb
<i>Crotalaria longifolia</i> Lam.	crotalária	Herb
<i>Crotalaria maypurensis</i> Kunth	crotalária	Herb
<i>Galactia eriosematoides</i> Harms	–	Shrub
<i>Glycine</i> sp.		Vine
<i>Machaerium acutifolium</i> Vogel	jacarandá-do-campo	Tree
<i>Stylosanthes acuminata</i> M. B. Ferreira & S. Costa	meladinho	Herb
<i>Vigna</i> sp.		Vine
Fabaceae-Mimosoideae		
<i>Anadenanthera falcata</i> (Benth.) Speg.	angico-do-Cerrado	Tree
<i>Mimosa capillipes</i> Benth.	mimosa	Herb
<i>Mimosa dolens</i> Vell.	juquiri	Shrub
<i>Mimosa rixosa</i> Mart.	mimosa	Herb
<i>Mimosa xanthocentra</i> Mart.	juquiri	Herb
<i>Stryphnodendron adstringens</i> (Mart.) Coville	barbatimão	Tree
<i>Stryphnodendron polyphyllum</i> Mart.	barbatimão	Tree
Lamiaceae		
<i>Aegiphila lhotskyana</i> Cham.	tamanqueira	shrub
<i>Hypenia macrantha</i> (A. St.-Hil. ex Benth.) Harley	–	herb
<i>Hyptis crinita</i> Benth.	–	herb
Lythraceae		
<i>Cuphea cartaginensis</i> (Jacq.) Machbr.	sete-sangrias	herb
Malpighiaceae		
<i>Banisteriopsis variabilis</i> B. Gates	–	shrub
<i>Byrsonima basiloba</i> A. Juss.	murici-amargoso	tree
<i>Byrsonima coccolobifolia</i> Kunth	murici-pequeno	tree
<i>Byrsonima intermedia</i> A. Juss.	canjica	shrub
<i>Byrsonima verbascifolia</i> (L.) DC.	murici	tree
<i>Heteropterys umbellata</i> A.Juss.	–	shrub
<i>Tetrapteryx ramiflora</i> A. Juss	cipó-preto	shrub
Malvaceae		
<i>Eriotheca gracilipes</i> (K. Schum.) A. Robyns	paina-do-campo	tree
<i>Peltaea polymorpha</i> (A. St.-Hil.) Krapov. & Cristóbal	malva-do-campo	shrub
<i>Sida linearifolia</i> A. St.-Hil.	–	shrub
<i>Waltheria communis</i> A. St.-Hil.	–	shrub
Melastomataceae		
<i>Miconia albicans</i> (Sw.) Triana	quaresmeira-branca	tree
<i>Miconia fallax</i> DC.	–	shrub
<i>Miconia ligustroides</i> (DC.) Naudin	vassoura-preta	tree
<i>Miconia stenostachya</i> DC.	papaterra	shrub
Myrsinaceae		
<i>Myrsine guianensis</i> Aubl.	capororoca-comum	tree
<i>Myrsine umbellata</i> (Mart.) Mez	capororoca-verdadeira	tree
Myrtaceae		
<i>Eugenia aurata</i> O.Berg	murtinha	shrub
<i>Eugenia bimarginata</i> DC.	aperta-goela	shrub
<i>Eugenia livida</i> Elmer	–	shrub
<i>Eugenia obversa</i> O. Berg	fruta-de-perdiz	shrub
<i>Eugenia puniceifolia</i> (Kunth) DC.	cereja-do-Cerrado	shrub
<i>Myrcia bella</i> Cambess.	cambuí	tree
<i>Myrcia guianensis</i> (Aubl.) DC.	guamirim-vermelho	tree
<i>Myrcia lingua</i> (O. Berg) Mattos & D. Legrand	brasa-viva	tree

TABLE 1. CONTINUED.

SPECIES	POPULAR NAME	HABIT
<i>Psidium cinereum</i> Mart. ex DC.	araçá	shrub
<i>Psidium incanescens</i> Mart. ex DC.	araçá	shrub
Ochnaceae		
<i>Ouratea spectabilis</i> (Mart. ex Engl.) Engl.	batiputá	tree
Poaceae		
<i>Loudetiopsis chrysothrix</i> (Nees) Conert	–	herb
<i>Panicum olyroides</i> Kunth	–	herb
Proteaceae		
<i>Roupala montana</i> Willd.	carne-de-vaca	shrub
Rubiaceae		
<i>Alibertia concolor</i> (Cham.) K. Schum.	marmelinho-do-campo	shrub
<i>Alibertia sessilis</i> (Vell.) K. Schum.	marmelada	shrub
<i>Coccocypselum lanceolatum</i> (Ruiz & Pav.) Pers.	piririca	herb
<i>Declieuxia fruticosa</i> (Willd. ex Roem. & Schult.) Kuntze	–	herb
<i>Palicourea rigida</i> Kunth	douradinha	shrub
<i>Spermacoce capitata</i> Ruiz & Pav.	poaia-da-praia	herb
<i>Tocoyena formosa</i> (Cham. & Schltdl.) K. Schum.	jenipapo-bravo	shrub
Salicaceae		
<i>Casearia sylvestris</i> Sw.	guaçatonga	tree
Sapindaceae		
<i>Serjania caracasana</i> (Jacq.) Willd.	–	vine
Sapotaceae		
<i>Pouteria subcaerulea</i> Pierre ex Dubard	curriola-rasteira	herb
Smilacaceae		
<i>Smilax polyantha</i> Griseb.	–	vine
Solanaceae		
<i>Solanum americanum</i> Mill.	maria-pretinha	shrub
<i>Solanum lycocarpum</i> A. St.-Hil.	lobeira	shrub
Styracaceae		
<i>Styrax camporum</i> Pohl	laranjeira-do-mato	tree
<i>Styrax ferrugineus</i> Nees & Mart.	laranjeira-do-campo	tree
Verbenaceae		
<i>Lantana camara</i> L.	cambarazinho	shrub
<i>Lippia lupulina</i> Cham.	rosa-do-campo	shrub
<i>Lippia velutina</i> Schauer	–	shrub
Vitaceae		
<i>Cissus inundata</i> (Baker) Planch.	–	vine
Vochysiaceae		
<i>Vochysia tucanorum</i> Mart.	pau-de-tucano	tree



TABLE 2. Areas of Cerrado *sensu lato* in São Paulo state compared with this study.

CODE FOR THE AREAS	STUDY SITE	PHYSIOGNOMY	GEOGRAPHIC COORDINATES	CLIMATE TYPE*	ALTITUDE (M)	N OF TAXONS	REFERENCE
A	Pratânia	Cerrado <i>sensu stricto</i>	22°48'50" S, 48°44'36" W	Cwa	720	120	Present study
B	Agudos	Cerrado <i>sensu stricto</i>	22° to 23° S, 49°30' to 48°50' W	Cwa	550	212	Bertoncini (unpublished data)
C	Assis	Cerrado <i>sensu stricto</i>	22°33'65" to 22°36'68" S, 50°23'00" to 50°22'29" W	Cwa	520 a 590	298	Durigan et al. (1999)
D	Assis	Cerradão	22°33'65" to 22°36'68" S, 50°23'00" to 50°22'29" W	Cwa	520 a 590	242	Durigan et al. (1999)
E	Botucatu	Cerradão	22°48' S, 48°17' W	Cfa	500	260	Bicudo (unpublished data)
F	Botucatu	Cerrado <i>sensu stricto</i>	22°45' S, 48°25' W	Cfa	550	301	Gottsberger and Silberbauer-Gottsberger (2006)
G	Botucatu	Cerrado <i>sensu stricto</i>	22°57'34" S, 48°31'20" W	Cfa	830	184	Ishara et al. (2008)
H	Santa Rita do Passa Quatro	Cerrado <i>sensu stricto</i>	21°43' S, 47°35' W	Cwa	600	141	Weiser and Godoy (2001)

\* According to the Koeppen Classification

TABLE 3. Jaccard’s Index among eight Cerrado *sensu lato* areas in São Paulo state. In bold the highest rates obtained. The areas are identified by letters (A to H) which are described in table 2.

	A	B	C	D	E	F	G	H
A	*	34,02	25,56	15,84	33,97	26,01	36,09	25,75
B	*	*	34,44	24,11	39,06	<b>45,74</b>	34,98	35,83
C	*	*	*	<b>45,37</b>	37,05	36,90	30,09	31,73
D	*	*	*	*	20,65	20,08	22,77	21,92
E	*	*	*	*	*	<b>54,02</b>	28,95	29,24
F	*	*	*	*	*	*	27,70	33,49
G	*	*	*	*	*	*	*	29,48
H	*	*	*	*	*	*	*	*

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